TECHNICAL NOTES

LAKE STATES FOREST EXPERIMENT STATION
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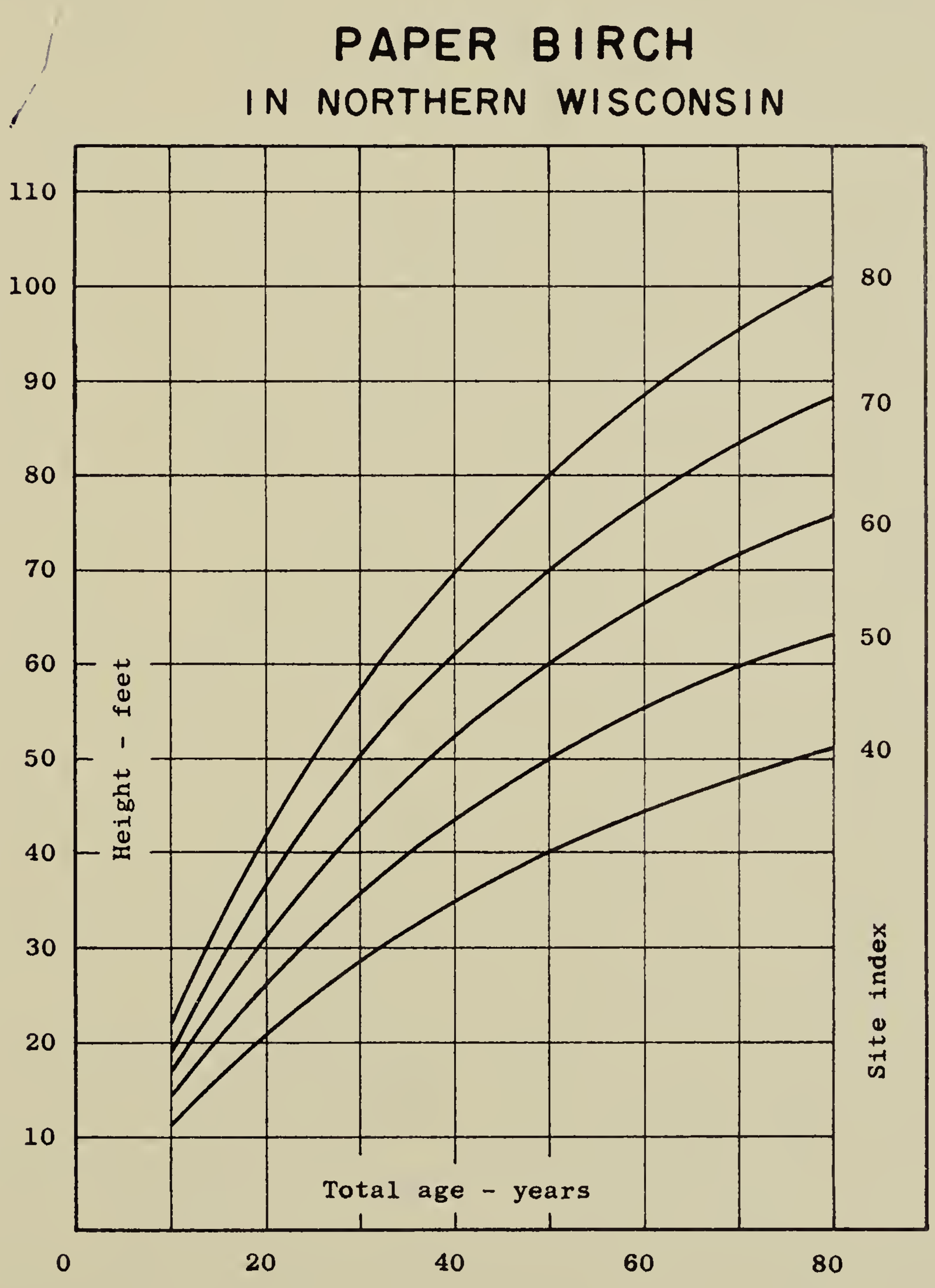
No. 541

Site Index Curves for Paper Birch in Northern Wisconsin

The site index graph for paper birch, Betula papyrifera, shown below is based on measurements taken on 104 plots in northern Wisconsin and 4 plots in the Upper Peninsula of Michigan.[1] The average age of dominant and codominant trees on these plots ranged from 17 years to 96 years, and site index at 50 years ranged from 34 feet to 77 feet. A statement on site index use and limitation is on the reverse side.



PAPER BIRCH
IN NORTHERN WISCONSIN

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[1] The study was conducted in part with funds contributed by several forest industries through the Lake States Council of Industrial Foresters.

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Site Index--Its Use and Limitations[2]

Site index is the height attainable by the average dominant and codominant trees in relatively pure, even-aged, and well-stocked stands at the age of 50 years. It reflects the combined effect of different environmental factors and is used as a measure of stand productivity.

To evaluate site index, a number of sample trees in a stand should be measured for total height and age. Only dominant and codominant trees should be used. These trees are part of the main canopy or extend above it, receiving full light from above but comparatively little from the sides. A good rule-of-thumb for an adequate sample of height measurements or age borings is

$$n = 5 + \frac{R^2}{30}$$

where R = observed range of total heights or ages in the stand. The selection of these sample trees should be made in some systematic manner, covering the range of diameter classes to insure a representative sample. The curves for paper birch recognize total age rather than age at breast height.

After the sample tree measurements have been taken, the average total height and the average age should be computed, using basal areas or squares of diameters as weights. A sample calculation is given below:

D.b.h. (Inches) (d)	Dominant and codominant heights (feet)	Average height (feet) (h)	Number of samples (n)	Computations			
				(d^2)	(nd^2)	(w)[1]	(wh)
7	48, 52	50	2	49	98	1.0	50
8	52, 55, 58	55	3	64	192	2.0	110
9	56, 57, 58	57	3	81	243	2.5	142
10	58, 60	59	2	100	200	2.0	118
Sum			10			7.5	420

Average height $= \frac{420}{7.5} = 56$

[1] Relative weights (w) are based on $nd^2 = 100 = 1.0$.

In estimating site index, the following limitations should be considered:

1. The index will not apply to any stands whose development, because of climatic or soil peculiarities, is expected to be widely different from the average trend portrayed by the curves. The curves assume that percent deviation of observed height above or below the central trend remains constant throughout the life of the stand.

2. The site index cannot be properly evaluated in stands where dominant and codominant trees have been affected by past suppression.

3. The curves should not be applied to extremely dense or very open stands where stagnation or excessive crown development is observed.

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[2] From Gevorkiantz, S. R. Site index curves for aspen in the Lake States. U. S. Forest Serv., Lake States Forest Expt. Sta. Tech. Note 464, 2 pp., illus. 1956.